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Products of the Photolysis of Nitrous Acid in a Benzene Matrix

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Poster Presentation 33

PRODUCTS OF THE PHOTOLYSIS OF NITROUS ACID IN A BENZENE MATRIX

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The photodegradation of nitrous acid in the troposphere is an initiation step in the formation of photochemical smog. NOx emissions from internal combustion engines react with atmospheric water vapor during sundown hours to form nitrous acid. Daytime sunlight cleaves nitrous acid into OH and NO radicals, which attack hydrocarbons emitted by industry to form the constituents of photochemical smog. In order to model this process, aqueous nitrous acid was extracted into a liquid benzene matrix to form a clear solution, which was photolyzed with 365 nm radiation. The photolysis generated a yellow liquid phase and a deep red precipitate. The liquid phase products have been identified by GC-MS and HPLC analysis as p-benzoquinone, phenol, nitrobenzene, o, m, and p-nitrophenol, 1,2, 1,3, and 1,4-dinitrobenzene, 2,4-dinitrophenol, biphenyl, and 2,3, and 4-nitrobiphenyl. The red precipitate is insoluble in benzene and ether but soluble in water, methanol and acetone. 13C-NMR spectroscopy has been inconclusive in identification of the red precipitate.